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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,371	02/09/2004	Ivan Tashev	MCS-063-03 (304217.01)	9761

27662 7590 05/09/2008

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EXAMINER
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ART UNIT	PAPER NUMBER
2615	

MAIL DATE	DELIVERY MODE
05/09/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/775,371	TASHEV ET AL.	
	Examiner	Art Unit	
	Ping Lee	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In view of the argument for 112, 1st paragraph rejection filed on 2/13/08, the previous final rejection has been vacated. Examiner would like to apologize for the delay.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-13 and 24-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The newly amended claim 1 and 24 state that "said external computing device performing all audio processing of the captured audio signal in accordance with the parametric information reported to the external computing device", however, the specification and the drawing as originally filed fail to provide support for this newly added limitation. There is no specific text in the original disclosure as filed that explicitly states that the external computing device performing **all** audio processing of the captured audio signal calibration in accordance with the parametric information reported to the external computing device. Fig. 3 shows that there is a connection between the

interface and the external computing device. However, this cannot constitute the newly added limitation that the external computing device performing **all** audio signal processing of the captured audio signals in accordance with the parametric information reported to the external computing device. One skilled in the art would also see that pre-amplifiers and the A/D converters also processed the captured audio signal based on the operational characteristic of the microphone array.

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 2, 7, 8, 14-18, 21, 22, 26, 27, 29 and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Arndt et al (hereafter Arndt) (US006954535B1).

In view of new matter rejection indicated above, claims 1-13 and 24-30 have been examined in view of the broadest interpretation.

Regarding claims 1, 8, 14, 16, 17, 24, 26, 29 and 30, Arndt discloses a microphone array (1), comprising:

an array of at least one microphone (2, 3);

a memory (21) contained within the array, said memory including parametric information which defines operational characteristics and configuration of the array (col. 4, lines 16-19);

an array interface for connecting the array to an external computing device (9);

wherein the parametric information included in the memory is reported to the external computing device (9) via the array interface upon connection of the array to the external computing device. The external computing device processes the captured audio signal in accordance with the parametric information reported to the external computing device.

The parametric information stored in the memory is being reported to the external computing device through the filter outputs. As shown in Fig. 2, the external computing device (9) is used for processing audio signals captured by the microphone array (18, 20) and transmitted to the external computing device (9). The filter parameters are used to define the FIR filters (col. 2, lines 55-58), so the external computing device (9) automatically configure audio processing software to reflect a current configuration of the microphone array (based on the signals from 17 and 19). The microphone array automatically determines the current configuration (based on the filter parameters for filter 4 and 5) upon being coupled to the external computing device (9) via the computer interface and the microphone array automatically reports the current configuration (by signal on 17 and 19 that define the current response) to the external computing device via the computer interface after the microphone array automatically determines the current configuration.

Regarding claim 2, Arndt shows that memory is a rewritable-type memory.

Regarding claims 7, 18 and 27, the claimed "audio capture characteristics of the microphone array" reads on different directional characteristics as disclosed in Arndt.

Regarding claim 15, Arndt shows the magnitude and phase gains for each microphone in the array is automatically determined (col. 2, lines 55-58).

Regarding claim 21, by sitting in a testing room, the claimed "a manual user calibration request" is inherently performed.

Regarding claim 22, by sitting in a testing room with the unit 9 control the measurement, the claimed "an external calibration request" is inherently performed.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 9, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt in view of Kanazawa et al (hereafter Kanazawa) (US006032115A).

Regarding claim 9, Arndt fails to disclose whether the measuring and evaluation unit processing signal in analog or digital domain. One skilled in the art would be motivated to search any related art that performs the calculation efficiently. Kanazawa teaches using A/D converter to convert the microphone signal and performs frequency analysis afterward. Thus, it would have been obvious to one of ordinary skill in the art to modify Arndt of by performing the signal analysis method as taught in Kanazawa in order to improve the frequency response of the microphone array.

Regarding claims 19 and 20, Kanazawa teaches the separate audio signal for each microphone (step s2, speech data #a, #b).

8. Claims 13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt in view of Hsieh et al (hereafter Hsieh) (US 20050254673A1).

Regarding claims 13 and 23, Arndt fails to show the microphones are MEMS-type microphones. Arndt teaches a general hearing aid with a general microphone array. One skilled in the art would have expected that any specific type of microphone that could be used in Arndt's hearing aid without generating any unexpected result. Hsieh teaches a MEMS-type of microphone and suggests that it could be used for hearing aid. Thus, it would have been obvious to one of ordinary skill in the art to modify Arndt in view of Hsieh by using MEMS-type microphone in order to improve the microphone performance.

9. Claims 3-5, 10-12 and 25 are rejected under35 U.S.C. 103(a) as being unpatentable over Arndt in view of Csermak et al (hereafter Csermak) (US 20040202333A1).

Regarding claims 3, 4, 10-12 and 25, Arndt fails to show the array comprising a self-calibration system. Arndt teaches that the calibration is performed external from the microphone array in a testing facility. However, Csermak teaches that a hearing aid should have self-diagnostics system for performing evaluation at any time. Thus, it would have been obvious to one of ordinary skill in the art to modify Arndt in view of Csermak by performing self-evaluation in order to identify a potential microphones malfunction without requiring the professional help.

Regarding claim 5, although not explicitly shown, preamplifier is inherently included and coupled to the microphone to provide signal in proper level.

Response to Arguments

10. Applicant's arguments filed 2/13/08 have been fully considered but they are not persuasive.

On p. 6, applicant argued that Arndt fails to disclose the claimed memory and the external computing device performs all audio processing of the captured audio signals in accordance with the parametric information reported to the external computing device. This is not persuasive. Arndt clearly discloses that the memory (21) stored the filter parameters which define the operational characteristics and configuration of the microphone array. In col. 3, lines 46-50, Arndt discloses that the external computing device (9) processes the captured audio (through 18) in accordance with parametric information. Furthermore, as shown in Fig. 2, the external computing device (9) processes the captured audio signal (through 18) in accordance with the inputs from 17 and 19 which are affected by the filter parameters (in 4 and 5) defining the operational characteristics of the array. As disclosed in col. 1 and col. 3, lines 45-46, Arndt's invention is to adjust the filter parameters, so the captured audio signal has a response that is closed to the desired ideal directional characteristic. Without inputs from 17 and 19, the external computing device cannot compare the captured audio with the processed audio signals (from 17 and 19) and determine the final filter parameter. The signals from 17 and 19 are the result of the signal processing based on the parametric information, so the signals from 17 and 19 include the parametric information defining the operational characteristics and configuration of the array.

On p. 7, applicant argued that Arndt fails to show that the all processing of captured audio signals is performed by the external computing device. It is not convincing. First of all, the pre-amplifiers and A/D converters in applicant's own invention process the audio signal, so not all processing of captured audio signal is performed by the external computing device. This has been indicated in the 112, 1st rejection above. Secondly, the external computing device in Arndt, in fact, processes audio signal by the accepting inputs from 18, 17 and 19. The word, process, means to subject to a special treatment. Measuring and evaluating of the captured audio signal (through 18) is a special treatment performed by the external computing device (9) in Arndt.

On p. 9, applicant argued that Arndt discloses internal processor within the hearing aid. It is not convincing. Applicant's disclosure may include additional features, however, it is the claimed limitation that is being examined. Applicant fails to claim AEC, for example, so this feature is irrelevant to the claimed invention. It is proper to compare the hearing aid disclosed in Arndt to the claimed invention because applicant simply claims a microphone array. As to the internal processor, applicant's invention includes pre-amplifiers and A/D converters on board, so they can be treated as internal processor as well. Lastly, the claimed invention never exclude that the microphone array to have internal processor.

On p. 12, applicant argued that Arndt fails to disclose the microphone array automatically determines the current configuration upon being coupled to the external computing device via the computer interface and the microphone array automatically

reports the current configuration to the external computing device via the computer interface after the microphone array automatically determines the current configuration. This is not convincing. Arndt clearly discloses that the current configuration is determined by the filters (4, 5). This is done automatically without any human intervention. Arndt also discloses that the invention is to adjust the microphone configuration, so the response is close to the idea response (col. 3, lines 44-46). The signals 17 and 19 provide the external computing device the current configuration of the microphone array because signals 17 and 19 are defined by filters (4, 5). The filters (4, 5) define the current configuration. Any new configuration (defined by the filter coefficients) will be transferred to the memory after the external computing device made the calculation. The claim never specifies that the current configuration is directly transferred to the external computing device via the memory.

On p. 14, applicant seems implied that the current invention processes AEC the captured audio signal in the external computing device using the current configuration of the microphone array. However, the claim never specifies what kind of process is being performed in the external computing device. Any special treatment to the captured audio signal could be read as processing the audio signal. So Arndt's external computing device (9) does process the captured audio signal based on the current configuration of the microphone array in order to determine a better configuration.

On p. 15, applicant argued that Arndt uses internal processor to process the audio signal. This is irrelevant to the claimed invention because the claims were rejected to 112, 1st rejection. Furthermore, applicant's disclosure clearly shows internal

processor (pre-amp and A/D converters) to process the audio signal. Lastly, Arndt clearly shows that the captured audio signal is being directly supplied to the external computing device through 18.

On p. 18, applicant argued that the current invention includes a memory and the microphone array automatically reads the parametric information from the memory and reports the parametric information to the external computing device and Arndt fails to show that. In view of the entire disclosure, Arndt does not teach that the memory has to store multiple set of parametric information. Arndt merely suggests that multiple sets could be stored. Furthermore, the hearing aid disclosed in Arndt is an automatic device. Once the device is being turn on, it will automatically set the hearing aid to a current configuration based on the parametric information from the memory. This parametric information is also being transferred to the external computing device through 17 and 19.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 571-272-7522. The examiner can normally be reached on Monday, Wednesday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian C. Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ping Lee/
Primary Examiner, Art Unit 2615

pwl